From Income Poverty to Multidimensional Quality of Life

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Abstract: In this paper we provide an overview of the movement in Ireland from a focus on income poverty to the incorporation of deprivation indicators in a multidimensional approach to the measurement of poverty. We then seek to place this approach, involving a restricted incorporation of deprivation dimensions, in the context of a broader multidimensional approach to the understanding of poverty in Ireland. We proceed to extend our consideration to multidimensional approaches to quality of life which have involved macro and micro approaches to developing aggregate measures that go well beyond the normal concerns of poverty research. In so doing, we will seek to show that while all of these approaches must face key judgements relating to choices of dimensions, thresholds, weighting and aggregation, there is significant variation in the challenges posed in relation to the scale of aggregation, the degree of multidimensionality aspired to and the availability of data sources that match such ambitions. Given these issues, the superiority of a multidimensional approach and of a focus more broadly on quality of life must be demonstrated rather than assumed.

I INTRODUCTION

In this paper we provide an overview of the movement in Ireland from a focus on income poverty to the incorporation of deprivation indicators in a multidimensional approach to the measurement of poverty (Watson *et al*., 2017a). We then seek to place this approach, involving a restricted incorporation of deprivation dimensions, in the context of a broader multidimensional approach to the understanding of poverty in Ireland. We proceed to extend our consideration to multidimensional approaches to quality of life (QoL) which have involved macro and micro approaches to developing aggregate measures that go well beyond the normal concerns of poverty research. In so doing, we will seek to show that while all of these approaches must face key judgements relating to choices of dimensions, thresholds, weighting and aggregation, there is significant variation in the challenges posed in relation to the scale of aggregation, the degree of multidimensionality aspired to and the availability of data sources that match such ambitions. Given these issues, the superiority of a multidimensional approach and of a focus more broadly on quality of life must be demonstrated rather than assumed. In what follows we address these issues.

II FROM INCOME POVERTY TO CONSISTENT POVERTY: A RESTRICTED MULTIDIMENSIONAL APPROACH

As Watson *et al*. (2017b) observe, with increasing awareness of the limitations of income as the sole means of capturing both levels of poverty and the underlying processes, there has been a fundamental shift towards a multidimensional approach (Nolan and Whelan, 2007). The limitations of measuring poverty by identifying those falling below a specified proportion of equivalent household disposable income are well known. They include the failure to take account of longer-term command over resources, unusually high expenses, accumulated debt, the distinctive circumstances of the self-employed and the role played by state services. Finally, relative income measures of poverty do not capture generalised economic fluctuations and shocks where poverty rates may remain static while standards of living rise or fall. This was true in relation to both periods of bust and boom in Ireland.

The incorporation of deprivation indicators in the Economic and Social Research Institute (ESRI) approach to poverty measurement in Ireland (Callan *et al*., 1993) was firmly located in the context of earlier critiques of purely relative income approaches, the widespread adoption in the EU of the terminology of social exclusion and in the theoretical context of Sen's (1993; 2009) argument that well-being should be defined in terms of capability deprivation. This understanding of poverty while being conscious of the broader implications of participation in society

maintains a clarity of focus on lack of resources. In the Irish case this led to a focus on what was labelled "basic deprivation" relating to enforced absence of items such as food, clothes, adequate heating and the presence of debt issues (Callan *et al.*, 1993). Over time the range of items was broadened to capture a wider notion of social exclusion, particularly in the inclusion of items on leisure, social participation and social obligation. However, in crucial respects, the choice of deprivation indicators in the context of social exclusion research is more restrictive than where research is guided by a wider conception of quality of life.

Going back to Ringen (1988) the mismatch between deprivation and low income measured at a point in time has been a focus of attention. The correlation between the basic deprivation indicators, although consistently higher than those relating to alternative forms of deprivation relating to consumption, health, housing and neighbourhood environment, is relatively modest. The level of association is influenced by the extent to which current disposable income serves as an adequate proxy for longer-term command over resources and the degree to which needs are satisfied through market mechanisms rather than welfare state provision (Kus *et al.*, 2016). The Irish consistent poverty measure approach responds to this issue by imposing a dual condition of being above a specified deprivation threshold and below an appropriate relative income threshold.[1] In contrast to the relative income measure both the basic deprivation measure and the consistent poverty were responsive to the impact of both bust and boom. In addition, where we focus on such joint exposure, socio-economic differentiation is shown to be a great deal sharper (Nolan and Whelan, 2011). The approach is therefore consistent with a theoretical perspective that locates poverty and deprivation in the wider context of social inequalities.

III UNDERSTANDING MULTIDIMENSIONAL POVERTY

The consistent poverty approach is open to the criticism that it fails to capture the multi-faceted and interactive complexity of the multidimensional experience of poverty (Tomlinson and Walker, 2009). It is indeed true that providing such an account could only be achieved by a mixed methods approach combining both quantitative and qualitative techniques and indeed by one that employs longitudinal rather than cross-sectional analysis. It is important, however, to distinguish between providing an in-depth account of the experience of poverty and successfully identifying those exposed to multidimensional deprivation. Achieving the latter is not dependent on accomplishing the former (Whelan and Maître, 2012).

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[1] The consistent poverty measure identifies people below 60 per cent of the household median income, deprived on at least two or more out of 11 goods and social participation items.

    Detailed accounts of multidimensional deprivation have been provided in the Irish case covering housing, health, consumption and neighbourhood environment (Whelan *et al*., 2007). However, the issues arising from limited overlap between dimensions, evident even in the restricted consistent poverty approach, looms larger when we seek to address multidimensional poverty profiles. When the number of dimensions increases and the overlap between dimensions is modest, issues relating to how to combine such dimensions become pressing. Atkinson (2003) distinguishes between the union and intersection approaches to combining deprivation dimensions. The former approach would count as deprived anyone found above the designated deprivation threshold on any of the dimensions. This is the approach adopted in the EU2020 poverty and social exclusion target which combines dimensions relating to income poverty, material deprivation and household worklessness (European Council, 2010). However, where the correlation between dimensions are modest and vary substantially across countries, the application of this approach results in a fundamental incoherence, with those defined as "at risk of poverty and social exclusion" exhibiting substantially different dimensional profiles across countries, and the numbers being defined as at risk being substantially influenced by the pattern of correlations between dimensions. Perfect correlation will mean that adding dimensions leads to no increase in the numbers defined as at risk, with zero correlation ensuring that all those above the appropriate threshold for any of the dimensions will be counted as at risk. Of course, the observed correlations will lie between these extremes. However, it remains true that a deprivation score will involve significantly variable multidimensional profiles across countries (or socio-economic groups) (Maître *et al*., 2014; Nolan and Whelan, 2007).
    The intersection approach brings its own difficulties when addressing deprivation across multiple dimensions. Whelan *et al*. (2007), employing the European Union Statistics on Income and Living Conditions (EU-SILC) to consider the extent of multiple deprivation in the Irish case, focused on five dimensions relating to basic, consumption, health, housing and neighbourhood environment deprivation. Table 1 shows the correlations between the dimensions. The basic deprivation measure correlates substantially with the consumption indicator with a correlation of 0.62. The correlations with the remaining dimensions are a good deal weaker. The highest correlation is one of 0.27 with neighbourhood environment, and the lowest that of 0.17 with health. The pattern for consumption is rather similar. Housing facilities correlations with neighbourhood environment and health status are 0.16 and 0.13 respectively. Finally, a similar level of correlation is found between neighbourhood environment and health status.
   In evaluating the extent of multiple deprivation, Whelan *et al*. (2007) chose thresholds such that for each deprivation dimension a significant but variable minority were above the cut-off point. This is consistent with the notion that multiple deprivation arises where excluded minorities overlap substantially.

Table 1: Correlations Between Deprivation Dimensions, Ireland EU-SILC 2004

	Basic Deprivation	*Consumption*	*Housing*	*Neighbourhood Environment*	*Health*
Basic Deprivation	1.00				
Consumption	0.62	1.00			
Housing	0.22	0.22	1.00		
Neighbourhood Environment	0.27	0.23	0.16	1.00	
Health	0.17	0.15	0.13	0.14	1.00

Source: Whelan *et al*. (2007).

The numbers above the threshold ranged from one-in-five for health to one-in-ten for housing. Figure 1 shows the distribution of multiple deprivation employing these thresholds. Over half were below the deprivation threshold on any of the five dimensions. In other words, the union approach would capture just less than half of the population as experiencing deprivation. Just over a quarter were deprived on only one dimension. Just less than one-in-five were deprived on two or more dimensions and one-in-ten on three or more. Finally, less than 1 per cent were deprived on all five dimensions. Thus, while a strict application of the intersection approach classifies 1 per cent of the population as deprived, for the union approach it rises to 45 per cent. Clearly the choice between these approaches is crucial to our understanding of the level and nature of multiple deprivation. It is also key to our understanding of the socio-economic distribution of such deprivation.

Figure 1: Overall Level of Multiple Deprivation, Ireland EU-SILC 2004
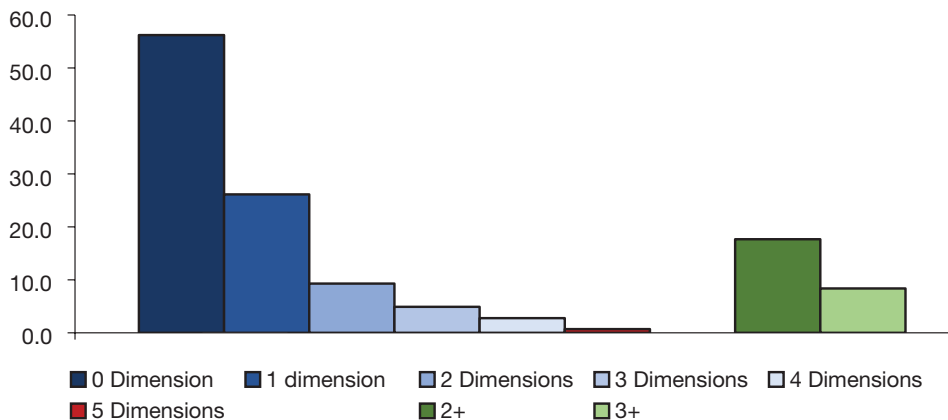
Source: Whelan *et al*. (2007).

A variety of analytic approaches have been developed in attempting to avoid the unpalatable choices involved in choosing between the union and intersection approaches. The academic and policy debates relating to such methodological approaches have focused on the value of summary indices for communication to a wider audience versus the potentially arbitrary nature of decisions required in combining distinct dimensions. Ravallion (2011) concludes that it is one thing to recognise that something is missing from a given measure and quite another to conclude that what is required is a single composite index. Nolan and Whelan (2007) note that while a case can be made for a multidimensional approach in seeking to adequately measure, understand and respond to poverty, they are not the same case and one does not simply follow from the other. For example, it is possible in principle that an income measure might succeed in identifying the poor but is not sufficient to capture the experience of poverty and it does not necessarily imply that the focus of social policy should be solely on income adequacy.

An alternative to constructing a multidimensional index is the "dashboard approach" which applies a standard unidimensional measure to each dimension. Dashboards, as Alkire *et al*. (2015) observe, have the advantage of broadening the set of considered dimensions and potentially allow for the use of the best data source for each particular indicator. A well-known example is the United Nations' Millennium Development Goals which span multiple dimensions but without forming a single composite index. Ravallion (2011) argues that the crucial difference between standard approaches and more recently proposed multidimensional measures is not the use of multiple indicators but the preference for a composite index versus a "large and eclectic dashboard" and the choices an analyst makes in collapsing multiple dimensions into one.

Ravallion (2011) points to the potential dangers of composite indices by asking rhetorically whether you would be happy that your doctor would base their assessment of your condition on a single composite index averaging and weighting the results from a battery of tests or whether you would be content with a car that collapses all the indicators on the dashboard onto one overall figure. The issue he stresses is not whether it is feasible to construct a composite index but whether it is sensible to do so for the particular purpose at hand.

On the other hand, as Alkire *et al*. (2015) emphasise, while dashboards have the advantage of broadening the set of dimensions considered and potentially allowing the use of the optimum database for each indicator, they have some significant disadvantages. Crucially, they do not reflect the joint distribution of deprivations across the population. Frequently this occurs because the level of aggregation at which the data are available, and the relevant databases do not permit calculation of correlations at the micro level that provide the basis for estimating the underlying multivariate joint distributions. Alkire *et al*. (2015) conclude that since dashboard profiles and composite aggregate indices share the inability to

capture the joint distributions of multiple dimensions, it means that neither can they answer the questions; Who is poor? How many people are poor? How poor are they?

IV THE ADJUSTED HEAD COUNT APPROACH TO MULTIDIMENSIONAL POVERTY

The ESRI research programme on poverty and deprivation involved a variety of analytic strategies that focused on exploring multidimensional poverty while avoiding the dilemmas presented by conventional applications of union or intersection approaches. These included using latent class analysis to identify those experiencing economic "vulnerability" in the sense of having a heightened level of risk of experiencing a distinctive risk profile in relation to income poverty, deprivation and economic stress, without necessarily experiencing multiple deprivation at a particular point in time (Whelan and Maître, 2005; Whelan *et al.*, 2010; Watson *et al.* 2014). Here we focus on the potential of applying a recently developed multidimensional approach with clearly understood axiomatic properties; namely the one recently developed by Alkire and Foster (2007; 2011a; 2011b) which allows one to examine in a systematic way the implication of key measurement choices for levels and profiles of multidimensional poverty. This approach was originally framed in the economic development context but has been applied more recently to the countries of the EU, making use of newly available and richer comparative data on various aspects of deprivation from the EU-SILC.

The Alkire *et al.* (2015) approach focuses on the relationships between dimensions but does so only having first identified a sub-set of the population above defined deprivation thresholds on a requisite number of dimensions. Their procedure involves a dual cut-off approach. The first relates to the choice of thresholds for individual dimensions. It should be clear that the decisions relating to thresholds both for individual dimensions and the number of dimensions required to satisfy the criterion of multidimensional deprivation are not given by the method but are matters of judgement. So too are the weights allocated to individual dimensions. The virtue of this approach is that it makes such judgements transparent. Given a set of deprivation dimensions considered as of equal weight, if a person's outcome on a given deprivation dimension j exceeds the appropriate threshold z_j then the person is said to be deprived on that dimension. The breadth of each person's deprivation is simply the number of deprivations s/he experiences. The second cut-off point k is used to determine whether a person has sufficient deprivations to be considered multidimensionally poor. If the individual's deprivation count is k or above, the person is identified as poor. To be multidimensionally poor, an individual must be above the deprivation threshold on the requisite number of dimensions.

The choice of thresholds, as we have stressed, involves judgements related to the purpose of the measurement exercise. For example, stricter thresholds would be appropriate in the case of high overlap among multiple dimensions with the purpose of identifying a minority group appropriate for intensive targeting of resources. On the other hand a less strict threshold might be preferable when considering a smaller number of dimensions or where one seeks to preserve sufficient numbers to allow decomposition of deprivation by population sub-groups.

Ultimately this approach takes account of deprivation only for those above the second cut-off point relating to the number of dimensions. Deprivation scores above 0 now relate only to those who are above the specified threshold for the requisite number of dimensions. All others are allocated scores of 0.

Employing this method, the head count H is the proportion of people who are multidimensionally poor. The intensity I is the average deprivation score for those experiencing multidimensional poverty. The Adjusted Head Count Ratio (AHCR) is the product of the head count by the intensity. Alkire and Foster (2011b) demonstrate that their methodology satisfies a range of desirable axiomatic properties. Of particular importance is decomposability in relation to dimensions and socio-economic groups, that is the ability to calculate the contribution of each dimension and group to the AHCR.

Whelan *et al*. (2014) applied this approach to data from the 2009 special deprivation module in EU-SILC. Their focus was on four dimensions relating to basic, consumption, health and neighbourhood environment deprivation, together with relative income poverty set at 60 per cent of median equivalised disposable income. Thresholds for the deprivation dimensions were chosen that came as close as possible to identifying the number of people below the income threshold to minimise the impact of differences in marginal levels across dimensions. The dimensions were weighted equally. If we focus on the uncensored or raw correlations, we find that the average correlation was 0.144. A different picture emerges for the censored correlation where deprivation is counted solely for those with scores above the minimum number of prescribed dimensions. Focusing on the uncensored correlations will inevitably lead to an extremely modest estimate of levels of multiple deprivation. Our motivation in focusing on the censored correlations is the desire to establish the extent to which there is a concentration of multiple deprivation among those deprived on at least two dimensions. The findings reveal an average correlation of 0.332, over double that for the censored cases confirming that there is a disadvantaged segment of the population for whom deprivations are more tightly clustered.

In Figure 2 we show the distribution of a range of poverty and deprivation indicators across 28 European countries analysed by Whelan *et al*. (2014). Focusing first on relative income poverty, we observe that, apart from a small number of Eastern European countries, variation in poverty rates is extremely modest. Not surprisingly, given the relative nature of the measure, the income poverty measure

largely fails to capture absolute differences in living standards between countries. The intersection approach to deprivation also fails to capture cross-national differentiation because multiple deprivation levels are close to zero in many countries and do not exceed 1.6 per cent in any of the countries. The union approach provides a sharp contrast and reveals significant country differences. However, this is achieved at the cost of recording implausibly high levels of multiple deprivation. The lowest level of 31 per cent is observed for Iceland. Fifteen countries had rates of over 50 per cent.

The AHCR provides an alternative picture. Where no one in a country experiences any of the deprivations it takes on a value of 0 and where everyone experiences deprivation on all items the value will be one. For the range of countries included in the analysis an outcome of 0.20 is at the extreme end of the range. The observed values range from 0.030 for Iceland to 0.313 in Romania. The AHCR is a great deal more successful in capturing cross-country variation than the alternative indicators. While the sharpest differential (ratio of the highest to the lowest) for the income poverty measure is 2.9, for the AHCR it reaches 10.4. Thus, the AHCR provides plausible differentiation in multidimensional poverty rates across a wide range of European countries.

Figure 2: Multidimensional Poverty by Country, EU-SILC 2009 (sorted by AHCR)
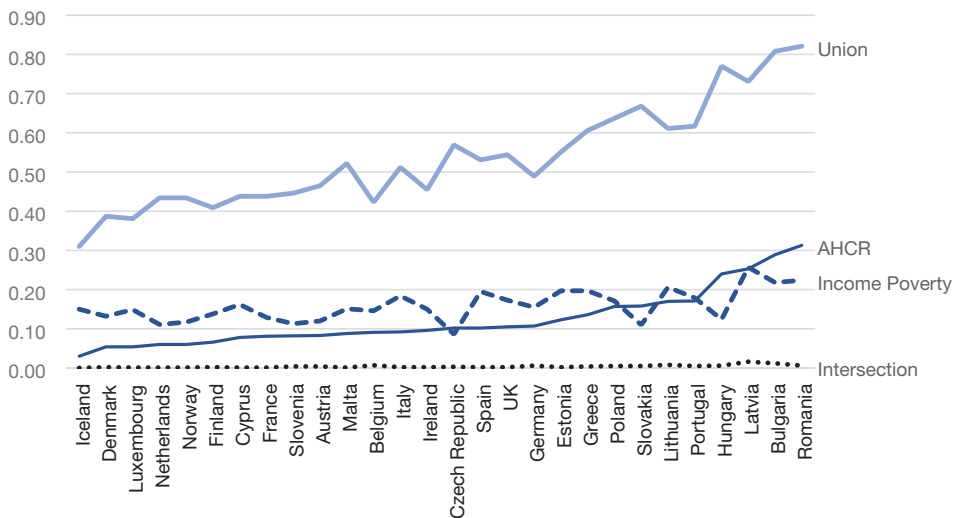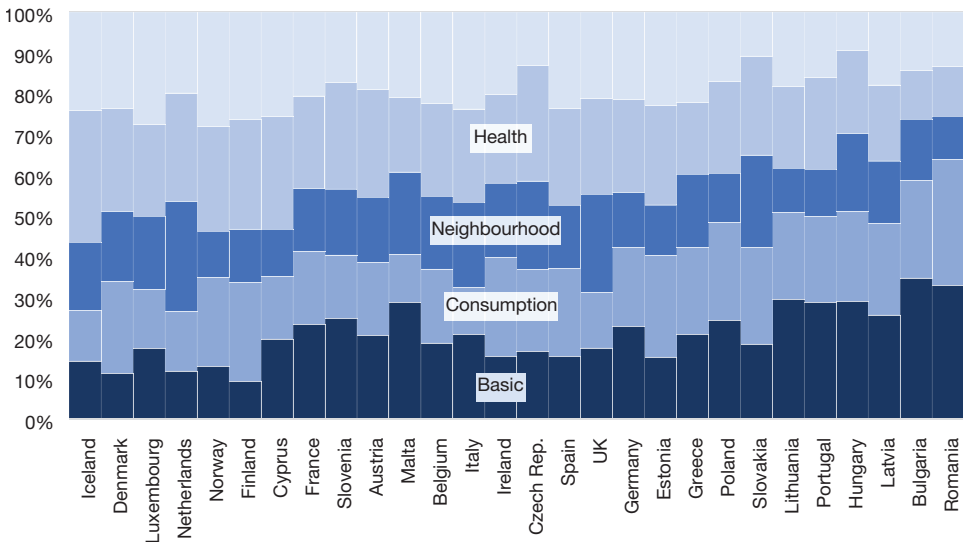

Source: Whelan *et al*. (2014).

Whelan *et al*. (2014) also demonstrate that the AHCR also varies systematically by social class within countries and by average income levels across countries. The combined effect is reflected in the fact that the full range of variation for the index

runs from 0.007 for the higher professional managerial class in Luxembourg to 0.371 for the routine working class and never worked group in Bulgaria – a disparity ratio of 53:1. Social class differences are substantial in every country. The cumulative effects of social class and country produces a situation whereby the most favoured social classes in the least affluent countries exhibit higher poverty rates than the least privileged in the more affluent countries.

In interpreting these findings, it is helpful to take advantage of the fact that the AHCR is decomposable in terms of dimensions. Whelan *et al.* (2014), as set out in Figure 3, where countries are ranked in terms of their relative income poverty rates, show that there is substantial variation across countries in the relative importance of dimensions. In the more affluent countries, basic and consumption deprivation play less prominent roles. In only four of the 15 most affluent countries does the figure rise above 0.20 and in only five does it do so for consumption. In no case is this value exceeded for both dimensions. The combined basic and consumption deprivation rates range from 0.264 in the Netherlands to 0.421 in Germany. In only two countries does it exceed 0.40. For neighbourhood environment the observed rate exceeds 0.20 only for the Netherlands, the UK and Italy. For these countries the largest contributors to the AHCR are the at-risk-of poverty and health dimensions. For these two dimensions combined the rate varies from 0.443 in Germany to 0.538 in Norway.

The pattern for the six least affluent countries provides a sharp contrast. The lowest value of the basic deprivation of 0.242 is observed for Poland and the highest

Figure 3: Decomposition of the Adjusted Head Count Social Exclusion Ratio by Dimension by Country EU-SILC 2009

Source: Whelan *et al.* (2014).

value of 0.329 and 0.347 for Romania and Bulgaria. For consumption deprivation the rates range from 0.220 in Hungary to 0.309 in Romania. The combined basic and consumption deprivation rate goes from 0.481 in Latvia to 0.638 in Romania. For these countries the contribution of neighbourhood environment is particularly modest and for the three least affluent countries the same is true of the at-risk-of-poverty indicator and health deprivation.

Employing the AHCR approach shows that it is possible to construct a multidimensional poverty index which shows systematic and intelligible variation across a wide range of European countries. However, there is a price to be paid for aggregation. What it means to be poor varies across countries particularly in relation to the contrast between more and less affluent countries with distinctively different profiles being observed. Both the nature of multidimensional poverty and the extent to which it is socially stratified varies by national level of income. The implication of these findings must be taken into account in assessing the extent to which the AHCR approach is fit for purpose. However, where a multidimensional approach is considered desirable, the AHCR approach illustrates the value to be gained from an approach with clearly understood axiomatic properties. Doing so allows one to evaluate the consequences of the measurement strategy employed for the levels of multidimensional poverty observed, the patterning of such poverty and the associated socio-economic composition and risk profiles, which are essential in making an informed assessment of the strengths and weaknesses of the choices made.

V QUALITY OF LIFE

Recognition of the need to go beyond income and wealth in measuring welfare/well-being has underpinned the development of a variety of broader concepts such as quality of life (QoL). Stiglitz *et al*. (2009) illuminated five "Classical Issues with GDP" to demonstrate how unfit GDP is to reflect many important aspects of economic or social progress including its inability to take into account a range of non-market activities and distributional outcomes. QoL is understood to reflect not only living conditions and control of resources across the full spectrum of life domains, but also the ways in which individuals respond to and feel about their lives. The analysis of quality of life is commonly informed by the capabilities approach of Sen, with attention to the type and range of things that people are enabled to do or be, rather than focusing solely on the material resources available to them (Sen, 1992; 1993). This includes personal resources, those linked to quality of social relationships and those deriving from the social, economic and political settings.

In 2007, the OECD hosted a World Forum on 'Measuring and Fostering the Progress of Societies' which has been fundamental in bringing together the broad

range of international work interested in moving beyond GDP and fostering the development of sets of economic, social and environmental indicators to assess societal progress, with the ultimate goal being to improve the well-being of individuals and households (OECD, 2013). The OECD launched the 'Better Life Initiative' in 2011 which comprises two elements: (1) 'Your Better Life Index', which is an interactive tool that allows OECD countries to compare well-being (OECD, 2011a), and (2) 'How's Life?' which provides a comprehensive picture of well-being, using the 'Framework for measuring well-being and progress' across OECD countries (OECD, 2011b; 2013).

The OECD Better Life Index identifies several dimensions, as set out in Figure 4, on the basis of which countries are given a score: housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety and work-life balance.[2] All dimensions are weighted equally with analysts being allowed to define their own weights ex post facto. It is worth noting that not all of these dimensions will be relevant to all stages of the life-cycle: work is directly relevant to the working-age population and work-life balance is particularly relevant to working families. The indicator of general life satisfaction is different from the others in its generality. Traditionally, societal well-being has been assessed via objective information across a variety of domains of life with subjective data being viewed with caution (Fahey *et al*., 2005). However, there has been an increasing focus on subjective feelings and emotions (Burchardt, 2013; Kelly and Tomlinson, 2013). Some have argued that life satisfaction is best regarded as an overall summary of quality of life that captures people's experience in a way that allows them to assess their lives on the basis of what is important to them (Watson *et al.,* 2010). In what follows we focus as far as possible on objective outcomes rather than subjective responses, although the line can become blurred.

Developing appropriate quality of life indicators poses serious analytic and methodological challenges that go substantially beyond those already identified in relation to multidimensional poverty and for which the social sciences are only partially equipped to respond. Data limitations frequently result in composite indices being constructed at an aggregate level. This results in an exacerbation of the issues identified by Ravallion (2011) of arbitrary weighting of dimensions and indicators within dimensions and lack of information on the relationships between dimensions and constituent elements. In the absence of such information it is not possible to calculate conventional measures of reliability or validity. Such measures are also likely to have significant limitations in relation to their ability to inform policy choices. Instead there is a considerable risk of being left with spuriously quantitative indicators which, as Ravallion (2011) notes, are incapable of providing answers to questions such as "should we focus on promoting job creation – or better health and education services?".

[2] Other examples of indices relying on macro data to construct quality of life related indices included Clarke and Kavanagh (2019) and Schraad-Tischler (2017).

Figure 4: Example of the OECD Better Life
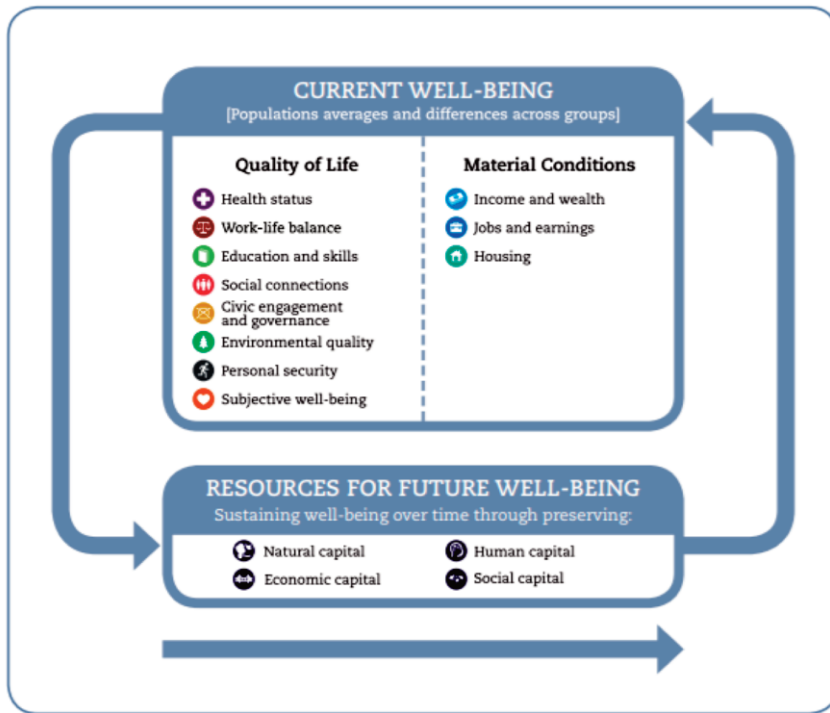
The choice of QoL dimensions will be influenced by a range of factors. First the dimensions must correspond to the unit of analysis. For example, the level of inequality in a society or level of democratic involvement might be considered an important component of quality of life but since it is measured at the aggregate level it is suitable for comparing nations but not individuals within nations. Second, if one wishes to compare levels of QoL across groups, dimensions must be relevant across these groups. The presumed causal sequence is another factor to be considered, particularly where it is planned to include a QoL indicator in a statistical analysis. For instance, for some purposes level of education might be seen as an outcome in its own right, particularly when comparing groups reasonably close to one another in age. For other purpose, one may be interested in the extent to which different levels of education are causally related to QoL outcomes more generally – such as access to material resources. As Whelan and Whelan (1995) argue, an uncritical insistence on multidimensionality in the indicator could paradoxically have the effect of obscuring the processes involved in generating QoL outcomes.

Table 2: Dimensions of Quality of Life and Indicators of Each Dimension, Ireland SILC 2013

Dimension	Indicator and Threshold	% identified
Income poverty	At-risk-of-poverty (below the 60% median income poverty threshold)	14.6%
Deprivation	Deprivation (lack 4 of more of the 11 basic deprivation items)	13.0%
Financial strain	Financial strain (5-item scale: threshold taken as having problems on 4 or 5 of the items)	16.0%
Health problems	Health problems (self-rated health 'very bad', 'bad' or 'fair')	19.8%
Mental distress	Mental distress (average on 5-item scale: threshold taken as those scoring 2 or higher on the scale ranging from 0 to 5)	16.1%
Crowded accommodation	Crowding (additive scale for number persons per room / bedroom, ranging from 0.06 to 2.06; threshold taken as score of 1.24 or higher)	17.3%
Housing quality problems	Dwelling quality problems (the 2-item scale: threshold taken as having problems either with dampness or with insufficient light)	18.2%
Neighbourhood problems	Local nuisance (3-item scale: threshold taken as having problems with noise, crime or pollution in the local area)	20.2%
Institutional mistrust	Institutional mistrust (3-item scale; threshold taken as those scoring 2.1 or higher on a scale ranging from 0 to 3)	16.1%
Lack of social support	Lack social support (2 item scale: threshold taken either having nobody with whom to discuss personal matters or nobody to ask for help)	6.7%
Lack of safety	Lack safety (feel 'very unsafe' in local area after dark)	12.2%

Source: SILC 2013 data for Ireland, analysis by authors. Population aged 16 and over on whom we have data from a direct interview (N = 5760).

The final aspect to consider is the range of potential QoL indicators available in the data. Watson *et al*. (2016) took advantage of the fact that the Irish SILC data in 2013 included a range of QoL indicators in addition to the core measures of poverty, deprivation and economic stress. They proceeded to draw on the available body of work on QoL to identify the relevant dimensions and their corresponding measures. Their focus was on dimensions relevant to the total adult population.

The dimensions, indicators and thresholds are set out in Table 2 (Watson *et al*., 2016). As with the previous poverty analysis, in choosing thresholds for the QoL they take the level of income poverty as a benchmark. In 2013 the at-risk-of-poverty rate across the entire population was 15.2 per cent. The threshold on each QoL indicator identifies a group that is as close as possible in size to this.

VI THE CHOICE OF THRESHOLD ON THE MULTIDIMENSIONAL INDICATOR

Since each dimension is weighted equally, the breadth of each person's QoL deficit is simply the number of QoL problems experienced, that is the number of items on which their score exceeds the threshold. Figure 5 (Watson *et al*., 2016) shows the percentage of adults exceeding the threshold on each number of dimensions. Well over one-quarter of adults experience QoL deficits on none of the 11 distinct dimensions while just over one-quarter experience QoL on one dimension.

Figure 5: Percentage of Adults Experiencing QoL Deficits by Number of Dimensions, Ireland SILC 2013
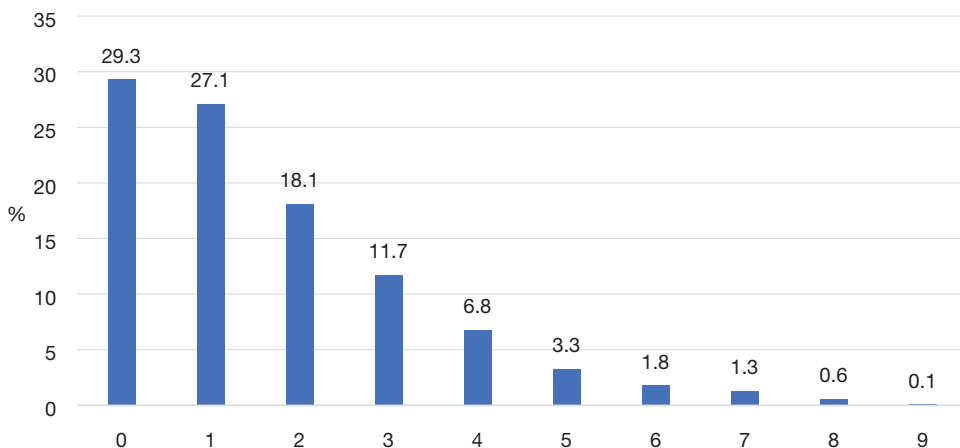
Source: SILC, 2013, analysis by authors. Population aged 16 and over on whom we have data from a direct interview (N=5,760).

As the number of dimensions increases by the point at which we get to eight dimensions, the percentage of adults experiencing that level of QoL problems falls to less than 1 per cent. None of the sample experiences deprivation on nine or more of the 11 dimensions.

As in all such analyses, there is a certain level of arbitrariness involved in deciding where to set the threshold. Choosing a threshold of 3+ would identify 25.5 per cent of adults as experiencing multiple QoL deficits, while a threshold of 4+ would identify 13.9 per cent. Although the 4+ threshold is nearer to the poverty level which was used to set the threshold on the individual items, focusing on the larger group has the advantage of facilitating sub-group analysis.

6.1 The Relationship between Quality of Life Dimensions

Having decided on the dimension thresholds, we focus on multidimensional QoL outcomes for those above the aggregate threshold. Those below the 3+ threshold are regarded as not experiencing multidimensional QoL problems and the scores on the component dimensions are set to zero. Dimension scores above 0 now relate only to those who are above the specified threshold for the requisite number of dimension (3+).

When we focus on the interrelationships between dimensions for the sub-set of the population experiencing multiple deficits (problems on 3+ of the dimensions), how does this compare to the picture for the population as a whole? Focusing first on the latter, we find that the highest correlation of 0.47 is between financial strain and deprivation dimensions. Of the remaining correlations, only that between mental distress and health problems reaches 0.30. The average correlation is 0.11. Focusing on the interrelationships for the population inevitably leads to modest estimates of multiple deprivation. We observe a substantially stronger pattern of correlation between dimensions for those above the 3+ threshold. The highest correlation is 0.60 (between financial strain and deprivation) and the average is 0.28 which is over 2.6 times the average for the population as whole.

6.2 The Head Count, Intensity and AHCR

Applying the AHCR method to estimate a measure of QoL we focus on three different indicators of the level of multidimensional disadvantage that can be derived from the AHCR methodology, as illustrated in Table 3. To facilitate comparison with income poverty and deprivation rates, we report figures from the AHCR approach in terms of percentages rather than proportions:

1. The head count H then becomes the percentage of people who are experiencing multidimensional QoL deficits – that is three or more quality of life problems. As noted above, this comprises 25.5 per cent of the population.
2. The intensity I is the average deficit score for those experiencing multidimensional QoL deficits – the proportion of the QoL indicators on which

they experience a deficit. This is 0.371 per cent of the population in the present case, indicating that those who are experiencing multidimensional QoL problems have problems on roughly one-third of dimensions included, or just over four of the 11 indicators.

3. The Adjusted Head Count Ratio (AHCR) is the product of the head count and the intensity, which is 9.46. This does not refer to a percentage of the population – that is what the head count does – but rather to a 'score' out of 100 that summarises both the level and intensity of multidimensional QoL deficits in the population.[3] A score of zero would indicate that no member of the population experiences problems with three or more of the QoL indicators. A score of 100 would indicate that all members of the population have problems with the maximum possible number of QoL indicators – a highly unlikely occurrence.

Table 3: Three Indicators of the Level of Multidimensional QoL Problems, Ireland SILC 2013

H: Multidimensional deprivation on quality of life (Head count, % of population with problems on 3+ QoL indicators)	25.5 %
I: Multidimensional intensity	37.1%
AHCR: Multidimensional adjusted head count ratio (H × I)	9.46

Source: SILC 2013, analysis by authors. Population aged 16 and over on whom we have data from a direct interview (N=5,760).

VII HEAD COUNT, INTENSITY AND AHCR BY AGE GROUP

To illustrate some of the issues involved in applying the AHCR approach in multidimensional analysis of QoL, in what follows we focus on life-cycle differences. In Table 4 we show the breakdown by age group of the three indicators of the level of multidimensional QoL deficits. For reference, we also show the national measures of income poverty and basic deprivation.[4] In Columns 4 and 5 we see the familiar pattern in relation to income poverty and basic deprivation, with levels tending to be higher for the younger age groups. The head count figures (H) in the first column indicate the percentage in each age group above the multidimensional QoL deficit threshold (problems in at least three indicators). This is similar to the pattern for poverty and deprivation in being higher for the younger than the older age groups. The level is 31 per cent for adults under 30, between

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[3] The AHCR could also be interpreted as the QoL problems experienced by the population as a percentage of the maximum possible across the 11 dimensions.

[4] Note that basic deprivation involves an enforced lack of two or more of the 11 basic items, whereas the indicator of deprivation that forms part of the AHCR has a threshold of three or more of the same items.

25 and 27 per cent for adults aged 31 to 64, and 19 to 20 per cent for adults aged 65 and over.

Table 4: Level of Multidimensional Quality of Life Deficits, Poverty and Deprivation by Age Group, Ireland SILC 2013

	Multidimensional Quality of Life Deficits				
	H: Head count	*I: Intensity poverty*	*AHCR*	*Income*	*Basic deprivation*
18 to 30	31%	37%	11.4	16.9%	35.9%
31 to 40	25%	37%	9.3	10.5%	29.1%
41 to 50	27%	39%	10.5	15.9%	32.4%
50 to 64	27%	37%	10.0	17.9%	28.9%
65 to 70	20%	33%	6.6	12.7%	18.7%
71 to 85	19%	34%	6.5	6.4%	14.6%
Total	26%	37%	9.4	14.0%	28.2%
Ratio of 18-30:71+	1.6	1.1	1.8	2.6	2.5

Source: SILC 2013, analysis by authors. Population aged 16 and over on whom we have data from a direct interview (N=5,691).

The second column (I) focuses on the average intensity level among those who have been identified as multidimensionally disadvantaged in terms of QoL. There is not a great deal of variation in this respect: among those with problems on three or more QoL indicators, the percentage of potential items lacked ranges from 33 per cent for the 65 to 70 age group to 39 per cent for the 41 to 50 age group.

In the third column we focus on the AHCR. Where nobody in an age group experiences any of the problems, it would take a value of 0 and where every individual experiences disadvantage on the maximum number of dimensions (11 in the sample of adults here) the value would be 100. Our observed range of values by age group ranges from 6.5 out of 100 for the over 70 age group to 11.4 out of 100 for those aged 18 to 30. As with the Head Count Index, values generally decline with age. In interpreting these results it is important to remember that a score of 100 would indicate the highly implausible outcome that every individual is above the deprivation threshold on all of the dimensions.

The amount of variation in level of multidimensional QoL problems by age group is somewhat less than the variation in income poverty and basic deprivation. This can be seen in the last row, which shows the ratio between the rates for the youngest and the oldest age groups. This ratio is 1.6 for QoL Head Count and 1.8 for the AHCR compared to 2.6 for income poverty and 2.5 for basic deprivation. The lower range for the QoL index arises because some dimensions of QoL are more of an issue for the younger age group and some for the older age group.

7.1 Decomposition of the Overall Score by Age Group and Dimension

One of the advantages of the adjusted head count ratio measure is that it is decomposable in terms of dimensions of QoL. In other words, we can calculate the contribution of each dimension to the overall AHCR.

In Figure 6 we show the decomposition of the AHCR for each age group. Note that the decomposition by dimension does not refer to the number of adults in each age group who have problems on that dimension. It is an indicator of composition rather than risk; it shows the contribution of each dimension to the overall QoL deficit 'package' (or AHCR) of adults in each age group who have multidimensional QoL problems. In other words, in Figure 6, housing quality problems account for roughly 10 per cent of QoL deficits across all age groups. The decomposition shows the relative importance of the different dimensions where the person has multidimensional QoL problems.

The indicators are sorted so that those that do not vary very much by age group are at the bottom of the chart, followed by those that tend to be more important for younger adults and with the dimensions that are more significant for older adults at the top of the chart. Problems with housing quality, mental distress and mistrust in institutions are of similar significance across the age groups. A lack of social support tends to be more significant for those in their middle years (5 to 6 per cent) than for the youngest and oldest age groups (2 to 3 per cent).

Figure 6: Decomposition of Multidimensional QoL problems (AHCR) by Dimensions within Age Group, Ireland SILC 2013
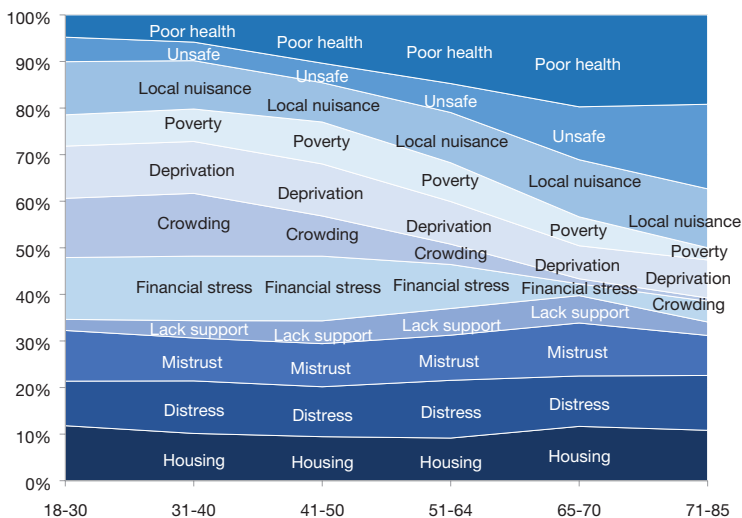
Source: SILC 2013, analysis by authors. Population aged 18 to 85 with data from direct interview. N persons multidimensionally disadvantaged = 1,458 with between 110 (age 65-70) and 364 (age 51-64) in each age group.

Financial stress, crowding, deprivation and income poverty form a larger component of the multidimensional QoL deficit package of younger adults. Crowding, in particular, declines very sharply with age, accounting for less than 4 per cent of the QoL problems after the age of 50 and 1 per cent after age 65, compared to 13 per cent among younger adults. Finally, health problems, local nuisance and lack of safety are more significant for the oldest age group. Among those over age 65, poor health accounts for 19 – 20 per cent of multidimensional QoL problems. In the oldest age group, feeling unsafe in the local area is almost as important, at 18 per cent. Poor health and lack of a sense of safety are of much less significance for younger adults, accounting for just 5 per cent each of multidimensional QoL problems for those under age 30.

VIII CONCLUSION

In this paper we have sought to provide an overview of the movement in Ireland from a focus on the measurement of income poverty to a multidimensional perspective on broadly based notions of quality of life. While it may appear that a multidimensional approach is, by definition, superior to a unidimensional one, this is not necessarily the case. It is important to maintain the distinction between providing an in-depth account of the experience of poverty or QoL and successfully identifying those exposed to multidimensional deprivation or multi-faceted QoL deficits.

Even restricting our attention to a narrower concern with poverty rather than a wider focus on QoL, we are almost immediately confronted with the issue of the manner in which we should aggregate deprivation dimensions, the weightings which should be attributed to the component dimensions and the choice that needs to be made between a composite index and a dashboard of outcomes. The union and intersection approaches point us in quite different directions. The intersection approach identifies a very small fragment of the population exposed to a series of overlapping dimensions. In contrast, the union approach identifies a large segment of the population exposed to one or more deprivations. These outcomes arise because deprivations are typically more loosely correlated than is frequently assumed. The Irish consistent poverty approach attempts to address these issues by imposing the dual condition of being below the 60 per cent income poverty threshold and above a basic deprivation threshold of 2+. There are judgements involved in relation to both criteria. What this approach seeks to achieve is to capture a rather broader notion of social exclusion than had been the case with earlier attempts through the inclusion of items relating to leisure, social participation and social obligation. However, the range of deprivation indicators involved is substantially more restrictive than where the focus is on broader conceptions of QoL.

The foregoing problems are substantially exacerbated in the latter case. Where the analysis is conducted at the macro level, there is an absence of information relating to the joint distribution of deprivation types across the population. Even where microdata are available, there are substantial challenges associated with composite indices of quality of life which arise not from the use of multiple indicators, as such, but in justifying the choices required in collapsing multiple dimensions into one. In the absence of such information it is not possible to answer a range of questions relating to the scale of QoL deficits, the profile of those experiencing such deficits and the cumulative scale of such deficits.

We have summarised an approach to the measurement of multidimensional poverty and quality of life employing the Adjusted Head Count Ratio approach. Central to this approach is the identification of a sub-set of the population that can be defined as multiply deprived and which proceeds to treat the relationships between dimensions differently for this group and the remainder of the population. The virtue of this approach is that it makes transparent the judgements relating to thresholds for both individual dimensions and deprivation aggregation and weighting of dimensions. Applying this approach produces outcomes in relation to multidimensional poverty and findings that are considerably more plausible in terms of levels and socio-economic profiles of deprivation and the scale pattern of cross-national variation than those associated with union and intersection approaches. Thus, it is possible to construct a multidimensional poverty index which shows systematic and intelligible variation across a wide range of European countries. However, what it means to be multidimensionally poor varies across countries; with contrasting profiles for more and less affluent countries.

Focusing on QoL we have emphasised that there is an inevitable degree of arbitrariness in deciding where to set a threshold. One of the major advantages of the AHCR approach is that it allows us to decompose the overall score by socio-economic characteristics and QoL dimension. The analysis reveals that the nature of multidimensional profiles in relation to QoL vary significantly across the life-course. Consequently, where we rely on a composite index of QoL we are not necessarily comparing like with like. The advantage of the AHCR approach is that the scale of these differences can be made transparent so that the trade-offs involved in calculating a composite index can be assessed rather than assuming its inherent superiority when compared to alternative approaches.

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